# U.S. FISH AND WILDLIFE SERVICE
# SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Contopus cooperi*

COMMON NAME: Olive-sided flycatcher

LEAD REGION: 7 (Alaska specific review only)

INFORMATION CURRENT AS OF: September 2008

STATUS/ACTION:

__X__ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

___ New candidate

___ Continuing candidate

___ Non-petitioned

___ Petitioned - Date petition received:

__ 90-day positive - FR date:

__ 12-month warranted but precluded - FR date:

__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)?

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

___ Listing priority change

Former LP: ___

New LP: ___

Date when the species first became a Candidate (as currently defined):

___ Candidate removal: Former LPN: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support

listing.
___ M – Taxon mistakenly included in past notice of review.
___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Birds; Tyrannidae; Tyrant flycatchers

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Region 7: Alaska.
Also in following states in other regions: Arizona, California, Colorado, Idaho, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Tennessee, Texas, Utah, Washington, West Virginia, Wisconsin, Wyoming, Vermont, Virginia.
Other countries: Bolivia, Brazil, Canada (Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador), Columbia, Ecuador, Guianas, Mexico (Baja California), Panama, Peru, Trinidad, Venezuela

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
Region 7: Alaska.
Also in following states in other regions: Arizona, California, Colorado, Connecticut, Idaho, Maine, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Mexico, New York, North Carolina, Oregon, Pennsylvania, Tennessee, Texas, Utah, Washington, West Virginia, Wisconsin, Wyoming, Vermont.
Other countries: Bolivia, Brazil, Canada (Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador), Columbia, Ecuador, Guianas, Mexico (Baja California), Panama, Peru, Trinidad, Venezuela.

Olive-sided flycatcher is still known to occur in all States/countries in which it occurred historically except for Maryland and Virginia.

LAND OWNERSHIP: The proportion of current habitat of olive-sided flycatcher in different land ownership categories within Alaska was estimated by overlaying a rough outline of its range in Alaska (as depicted in Figure 1) with Alaska General Land Status (AGLS) coverage in ArcGIS. The AGLS coverage contains land ownership records, at the section level, extracted from Bureau of Land Management (BLM) and Alaska Department of Natural Resources' land records in 2006. Based on this analysis, olive-sided flycatcher habitat in Alaska is estimated to be located on 61% federal (608,556 $km^2$), 30% state (295,242 $km^2$), 8% native (81,850 $km^2$), and <1% private (8,412 $km^2$) lands. The federal lands are managed by BLM (25% of total habitat), National Park Service (15%), U.S. Fish and Wildlife Service (FWS), (12%), U.S. Forest Service (8%), and Department of Defense (1%). The proportion of the olive-sided flycatcher population nesting on each of these land ownerships is unknown; however, a large proportion of habitat is found on Federal or Alaska State lands that have some designated protected management status (e.g., parks, refuges, reserves, forests).

LEAD REGION CONTACT: Sonja Jahrsdoerfer, (907) 786-3323, Sonja_Jahrsdoerfer@fws.gov

LEAD FIELD OFFICE CONTACT: Ted Swem, Ecological Services, Fairbanks Field Office, (907) 456-0441, Ted_Swem@fws.gov

BIOLOGICAL INFORMATION:

Species Description

The olive-sided flycatcher (*Contopus cooperi;* Nuttall 1831) is a medium-sized songbird, but a large species in the tyrant flycatcher family with total length 18-20 cm (Altman and Sallabanks 2000, p. 2). This species is identified among the forest flycatchers primarily by its large head, stout bill, erect posture and its plumage, which is deep brownish olive-gray above, white on throat and center of breast and belly, and strongly contrasting (often streaked) olive-gray on sides and flanks (Altman and Sallabanks 2000, p. 2). Males and females are similar in plumage throughout the year, with males having longer wings (Pyle 1997, p. 214). This species typically uses the top of tall trees and snags for singing and foraging perches and has a unique, loud three-note whistle song described as "quick, three beers" (Altman and Sallabanks 2000, p. 1). The olive-sided flycatcher is distinguished from the other members of the *Contopus* genus found in North America by its proportionally shorter tail, less-pointed crest, larger size, stockier build, and distinctive plumage pattern from the greater pewee (*C. pertinax*), and proportionally larger head and bill, and vocalizations from the eastern (*C. virens*) and western (*C. sordidulus*) wood-pewees (Altman and Sallabanks 2000, p.2).

Taxonomy

Careful review of the available taxonomic information for olive-sided flycatcher indicates that it is considered a monotypic, valid taxon (AOU 1998, p. 390). The species was formerly placed in the monotypic genus *Nuttallornis* and was formerly known as *C. borealis*. The name was changed to *C. cooperi* following Banks and Browning (1995; p. 636) and American Ornithological Union (1998; p. 390).

The species is genetically distinct from the closely related eastern and western wood-pewees (Zink and Johnson 1984, pp. 207-213) and former *fumigatus* group of genus *Contopus* [i.e., greater (*C. pertinax*), dark (*C. lugubris*), and smoke-colored pewees (*C. fumigatus*) (Mayr and Short 1970, p. 60)].

Although the olive-sided flycatcher occurs widely across North America, little variation is observed, except for western birds being slightly larger than eastern birds (Bangs and Penard 1921, pp. 90-91, Altman and Sallabanks 2000, p. 4). Bangs and Penard (1921, pp. 90-91) first proposed "eastern" and "western" subspecies, which was also suggested by Grinnell (1928), with different subspecies names (*majornis, borealis, cooperi*) suggested by several authors (Banks and Browning 1995, p. 185). The two currently recognized subspecies are described as *C.c. marjorinus*, which is the larger subspecies breeding in southern California and northern Baja California, Mexico, and *C.c. cooperi*, which is the smaller subspecies breeding in the rest of the North American range, including Alaska (Pyle 1997, p. 213; Altman and Sallabanks 2000, p. 2). Further studies to verify the subspecific taxonomy of the species would be useful to determine

population units for management. This document refers to the full species, with a focus on assessing its status in Alaska (FWS Region 7).

Habitat/Life History

Olive-sided flycatcher biology was reviewed by Altman (1997, pp. 1-61) and Altman and Sallabanks (2000, pp. 1-28). The only breeding biology study in Alaska was conducted by Wright (1997, pp. 1-34) in central Alaska from 1994 to 1996, in which 13 nests were monitored near Fairbanks and Glennallen. This was considered a preliminary study that focused on determining if survey methods relying on the detection of singing males were suitable monitoring tools for the species (Wright 1997, p. i). Further study of olive-sided flycatcher nesting ecology is needed in Alaska.

The olive-sided flycatcher is primarily a forest inhabitant, typically found in forest edges and openings, especially in areas with tall trees or snags (Altman and Sallabanks 2000, p. 6). While it is considered an indicator species of the coniferous forest biome throughout North America, its breeding habitat includes taiga, subalpine coniferous forest, spruce bogs, burns, and mixed coniferous-deciduous forest with standing dead trees (AOU 1998, p. 390). In migration it is found in a variety of forest habitats (e.g., pine-oak woodland, deciduous riparian forest, evergreen and semideciduous forests) and in winter the species inhabits primarily mature subtropical and tropical montane wet forest (AOU 1998, p. 390; Altman and Sallabanks 2000, p. 7-8).

In central Alaska, the olive-sided flycatcher is primarily found in white and black spruce (*Picea glauca* and *P. mariana*) forest, predominantly with openings [e.g., muskegs (a swamp or bog occurring in depressions in poorly drained alluvial or glacial terrain), meadows, burns, logged areas] and water (e.g., streams, beaver ponds, bogs, lakes) (Wright 1997, p. 14; BPFWG 1999, p. 81; Altman and Sallabanks 2000, pp. 6-7).

Uneven canopies and snags are necessary for the olive-sided flycatcher as it uses prominent perches for both feeding and singing. In central Alaska, males primarily perch on top of white spruce, with more than 80% of perches composed of dead topped or dead trees, and perches averaging 1.4 times taller than the surrounding canopy (Wright 1997, p. 10).

Throughout its range, the olive-sided flycatcher has been noted as a species associated with disturbances such as wildfire and timber harvesting (Hutto 1995, p. 1047-1050; Altman 1997, pp. 14-18; Hutto and Young 1999, p. 25; Altman and Sallabanks 2000, pp. 6-7). It has been hypothesized that this association is due to the creation of forest openings and snags, as well as possible enhanced foraging opportunities with suggested increases in aerial insect numbers after fires. However, a recent focused study of olive-sided flycatcher use of burned forest in California concluded that "olive-sided flycatchers experienced relatively high nest loss and relatively low prey biomass and foraging rates in burned habitat during the first two years after moderate- to high-severity wildfire" (Meehan and George 2003, p. 1111).

The olive-sided flycatcher feeds almost exclusively by aerial hawking (prey is pursued and caught in flight) for large insects from prominent perches (Murphy 1989, p. 5; Altman and

Sallabanks 2000, p. 8). It forages by "sallying" prey by using a "yo-yo" flight, which is described as flying off a perch, capturing a flying insect, and then flying back to the same or another prominent perch (Fitzpatrick 1980, p. 44; Altman and Sallabanks 2000, p. 8). This species is the most aerial member of the North American tyrant flycatchers and the only member known to depend almost exclusively on one method of foraging (Eckhardt 1979, pp. 134-135; Murphy 1989, pp. 5-6). During the breeding season, the olive-sided flycatcher diet consists largely of flying insects of order Hymenoptera (e.g., bees, wasps, flying ants), as well as beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), grasshoppers (Orthoptera), and dragonflies (Odonata) (Bent 1942, pp. 296-297; Otivs and Stark 1985, pp. 973-981; Beal 1912 and Pearson 1936 cited in Altman and Sallabanks 2000, p. 9). In central Alaska, yellow-jacket wasps (*Vespula* spp.) and dragonflies (*Libellula* spp.) are reported as important prey (BPFWG 1999, p. 81; Altman and Sallabanks 2000, p. 9).

Male olive-sided flycatchers arrive on the breeding grounds first, and commence singing from perches to establish territories and attract females. The species is generally considered to be monogamous during a breeding season (Altman and Sallabanks 2000, p. 11). In central Alaska, males arrive in late May to early June, with females arriving 7-9 days later (Wright 1997, p. 5). Nesting pairs have relatively large territories and are intolerant of conspecifics (Altman and Sallabanks 2000, p. 11). Nest trees are usually shorter than perch trees and are generally selected by females. Olive-sided flycatchers build open-cup nests of twigs, rootlets, and lichen at various heights above ground, but usually towards the tip of a horizontal branch (Altman and Sallabanks 2000, p. 14). In central Alaska, nests are typically placed in spruce trees, at an average height of 6.4 m above the ground (Wright 1997, p. 10).

First clutches in central Alaska were initiated late May to mid-June (Wright 1997, p. 5). Clutch size throughout its range has been reported as 2-5 eggs, but typically 3, followed by 4 as most common number (Altman and Sallabanks 2000, p. 16). During the 2 year study in central Alaska, all first clutches had 4 eggs (Wright 1997, p. 5). Only females incubate, with males bringing food to nesting females (Altman and Sallabanks 2000, p. 15). Incubation period has been reported as 14-19 days, with 15-16 days in central Alaska (Wright 1997, p. 5; Altman and Sallabanks 2000, p. 15). Nestling period was reported as 15-23 days (Altman and Sallabanks 2000, p. 16), with both parents feeding young (Altman and Sallabanks 2000, p. 16). In central Alaska, hatching was reported from mid-June to early July, with fledging in July (Wright 1997, p. 5). Fledglings continue to be fed by their parents after departing the nest and remain close to each other and adults within territories for about 10-15 days (Altman and Sallabanks 2000, p. 16), and up to 17 days observed in central Alaska (Wright 1997).

Renesting has been documented after first nests fail, through mid-July in central Alaska (Wright 1997, p. 9). Only a single brood is raised per year (Altman 1997, p. 9; Altman and Sallabanks 2000, p. 15). During the 2 years of the central Alaska study, Mayfield estimate of nest success was 27% for first nests ($n = 13$), 72% for renests ($n = 4$), and overall 62% (8 of 13 pairs; Wright 1997, p. 9). One failure was attributed to a severe storm and the rest were suspected to be depredated (Wright 1997, p. 9). Suspected egg and nestling predators in central Alaska include red squirrels (*Tamiasciurus hudsonicus*) and gray jays (*Perisoreus candensis*)(Wright 1997, p. 9). Predation on adults has not been recorded, but feathers were found in a peregrine falcon (*Falco*

*peregrinus*) aerie in Alaska (Altman and Sallabanks 2000, p. 12). In an Oregon study, Mayfield nest success was 43% ($n$ = 174), with 30 renests of 28 pairs (including 2 double renests) documented (Altman 2000, p. 5). In Montana, nest success was 61% ($n$ = 18) in naturally burned habitats but only 30% ($n$ = 17) in harvested habitats, where nest predator species were estimated to be twice as abundant (Robertson and Hutto 2007, pp. 115-116).

Limited information exists on the life span of olive-sided flycatchers and no adult survivorship studies have been conducted (Altman and Sallabanks 2000, p. 17). A few band recoveries indicate this species lives at least 7 years (Altman and Sallabanks 2000, p. 17).

The olive-sided flycatcher makes the longest migration of any North American breeding flycatcher (Murphy 1989, p. 12). As a result, fall departure is early and spring arrival is late. This is also likely due to food availability, as aerial insects are vulnerable to cold (Altman and Sallabanks 2000, p. 4). Fall migration in Alaska begins in early August with the latest record in early September (Altman and Sallabanks 2000, p. 5). Spring departure from wintering grounds in South America occurs from March through April (Altman and Sallabanks 2000, p. 5) and arrival in central Alaska occurs from mid- to late May (Kessel and Gibson 1978, pp. 59-60). Primarily mountain habitats in western North America, Mexico, and Central America are used during spring and fall migration (Atman 1997, p.4; Altman and Sallabanks 2000, p. 7). The migration route and wintering areas used by Alaskan-breeding olive-sided flycatchers is unknown.

Historical and Current Range/Distribution

The historical distribution of olive-sided flycatcher in Alaska is poorly documented; thus, we can not say with any certainty that the species has disappeared from any of the breeding localities from which it has been found or reported in Alaska.

The olive-sided flycatcher breeds only in North America, in boreal forests of Canada and western and northeastern United States (Figure 1). An estimated 23% of global populations breeds in Alaska (Partners in Flight landbird population estimates database, http://rmbo.org/pif/db/laped/PED3/aspx), 54% in Canada (COSEWIC 2007, p. 5), and 23% in western and northeastern United States. The flycatcher migrates to central and South America for the winter (Figure 1), where its distribution is more restricted, primarily to forests in Panama and the Andes Mountains of northern and western South America from Venezuela to Peru and Bolivia (Altman and Sallabanks 2000, p. 3).

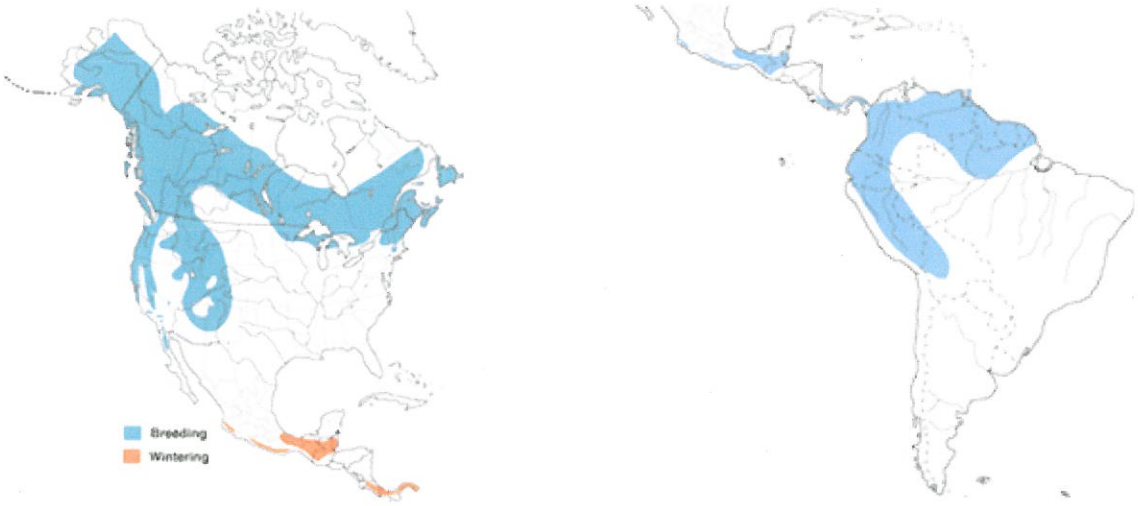


Figure 1. Global range of the Olive-sided Flycatcher (wintering range in orange on left and blue on right), from Altman and Sallabanks (2000, pp. 1 & 3).

Within Alaska, olive-sided flycatchers occur during the breeding season in boreal and coastal forests found in central, south-central, southeast, and sparingly in the western part of the state (Kessel and Gibson 1978, pp. 59-60). The flycatcher ranges to the northern and western extent of coniferous forest to Noatak River in the northwest, Bethel and Katmai areas in the west/southwest, and to Colleen and Porcupine rivers in the northeast (Figure 2; Kessel and Gibson 1978, pp. 59-60). Kessel and Gibson (1978, p. 59-60) described the species as uncommon breeder throughout the taiga in central Alaska and uncommon probable breeder in southeastern Alaska; rare migrant and breeder found peripherally with the taiga in western, southwestern, and Anchorage; very rare migrant in other parts of southcoastal Alaska; and accidental on Middleton Island and northern Alaska. They define "uncommon" as "species occurs regularly, but utilizes little of the suitable habitat, and/or the region regularly hosts relatively small numbers of the species; not observed regularly even in proper habitats" and "rare" as "species within its normal range, occurring regularly but in very small numbers. "Very rare" is used for a "species which occurs more or less regularly, but not every year, and usually in very small numbers" and "accidental" is "a species so far from its normal range that further observations are unlikely; usually occurs singly" (Kessel and Gibson 1978, p. 7-8). Armstrong (1995, p. 212) defines the species abundance as uncommon in central Alaska, rare in southeastern, southcoastal, southwestern and western Alaska, and incidental in northern Alaska.

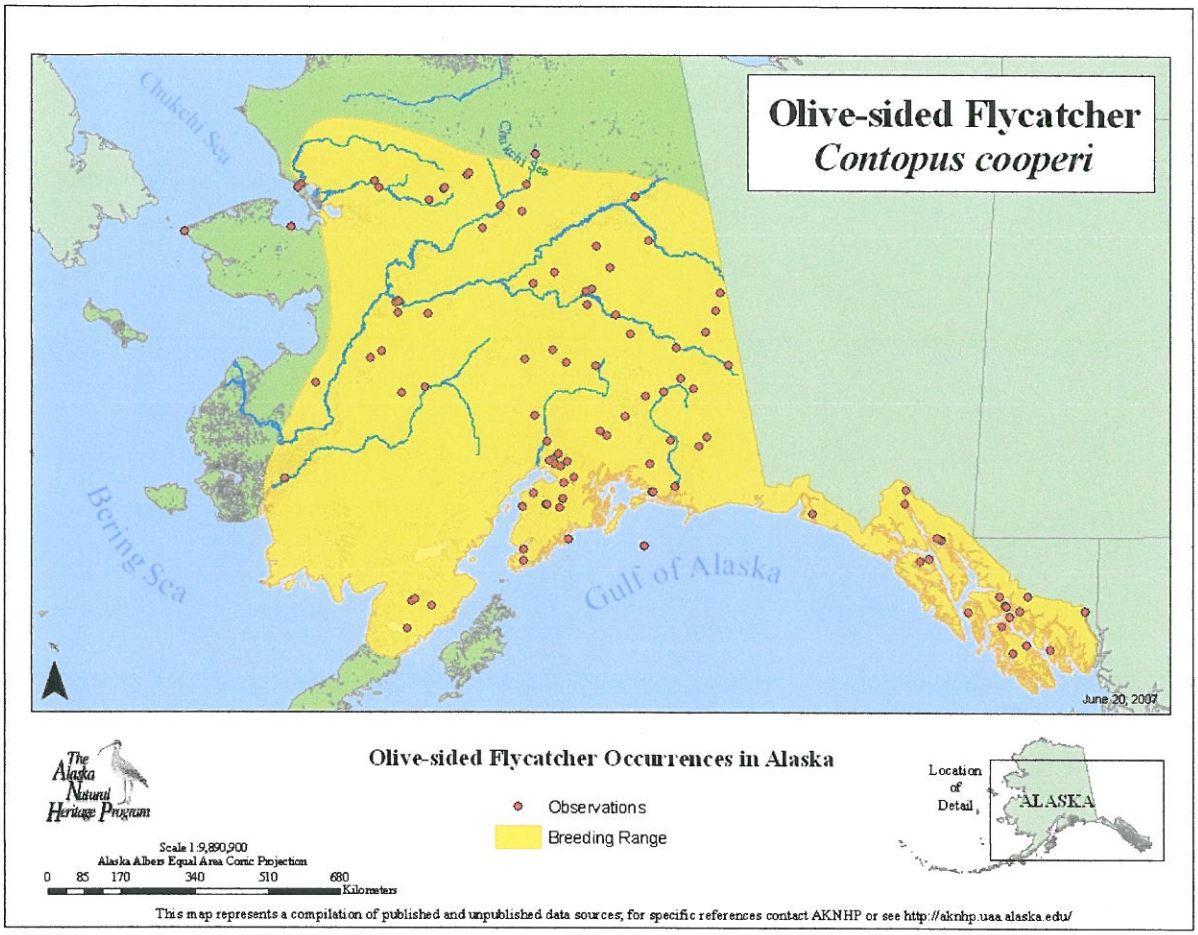


Figure 2. Observations (compiled from BBS data and independent research projects) of olive-sided flycatchers in Alaska, 1956-2005, from Alaska Natural Heritage Program. (http://aknhp.uaa.alaska.edu/zoology/Zoology_Birds_track07_PASSERIFORMES.html).

Population Estimates/Status

Population estimates for olive-sided flycatcher are based on the Breeding Bird Survey (BBS), which is a road-based survey. The BBS is the only survey that has recorded the species in sufficient numbers to monitor population trends, but is suspected to be inaccurate due to lack of complete coverage of olive-sided flycatcher range, particularly in northern boreal forests (Dunn et al. 2005, p. 20). Partners in Flight estimates one-third or more of the North American breeding range of the olive-sided flycatcher is not covered by a breeding-season survey (Dunn et al. 2005, p. 20). In several states, including Alaska, BBS data have important deficits, such as small sample sizes, low relative abundances on survey routes, imprecise trends, and missing data (BBS regional credibility measures accessed at www.mbr-pwrc.usgs.gov/bbs/cred.html). The global population estimate for olive-sided flycatcher is 1,200,000 (Rich et al. 2004, p.18) and the Alaska state estimate is 300,000 (Partners in Flight landbird population estimates database, http://rmbo.org/pif/db/laped/PED3/aspx). An estimated 23% of the global population breeds in Alaska (Partners in Flight landbird population estimates database, http://rmbo.org/pif/db/laped/PED3/aspx).

BBS data indicate a 3.3% annual decline ($P < 0.01$, $n = 737$ routes) in populations throughout North America and Canada for the period 1966-2007 (Figure 3; Sauer et al. 2008). It is suspected that decline may be due to rapid loss of forested habitats on the wintering grounds (Altman and Sallabanks 2000, p. 19).

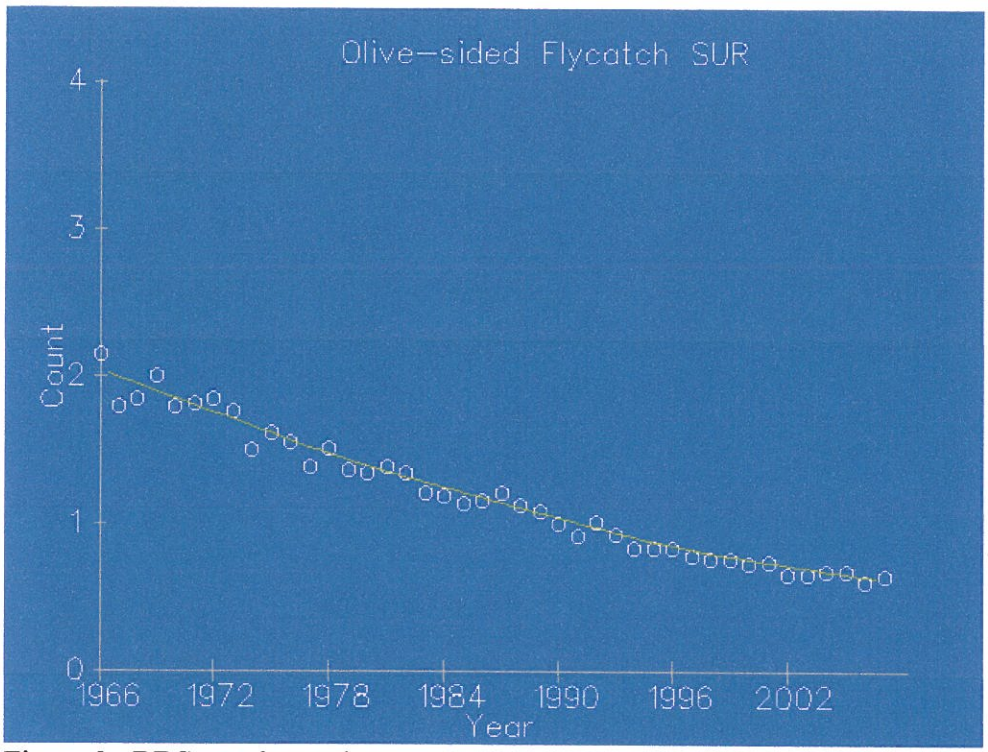

Figure 3. BBS trends results survey-wide for olive-sided flycatcher, 1966-2007 (from Sauer et al. 2008). Y-axis is average count of olive-sided flycatchers per route.

In November 2007, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed the olive-sided flycatcher as threatened in Canada under the Species at Risk Act due to widespread and consistent population declines in Canada over the last 30 years and no evidence that the decline has ceased (COSEWIC 2007, p. 18). The causes of decline are uncertain. An estimated 54% of the species breeds in Canada; the annual rate of decline there is 3.9% during 1966-2007 and 4.5% from 1980-2007 (Sauer et al. 2008).

The BBS coverage is limited in Alaska, with few routes conducted prior to early 1990s. This road-based survey only samples a small proportion of the olive-sided flycatcher's breeding range in Alaska due to the state's sparse road system. In addition to the short time series, few olive-sided flycatchers are counted on the small number of routes covered; thus the sample size for determining a population trend and the level of precision are extremely low. The BBS estimates a 1% annual decline ($P = 0.46$, $n = 56$ routes) in Alaska for the period 1982-2007 (Figure 4; Sauer et al. 2008). During approximately the same time interval (1980-2007), the annual rate of decline for the entire United States was estimated as 2.6% ($P < 0.01$, $n = 480$ routes), with FWS Region 5 (northeast) declining 6.7% annually ($P < 0.01$, $n = 60$ routes; Sauer et al. 2008).

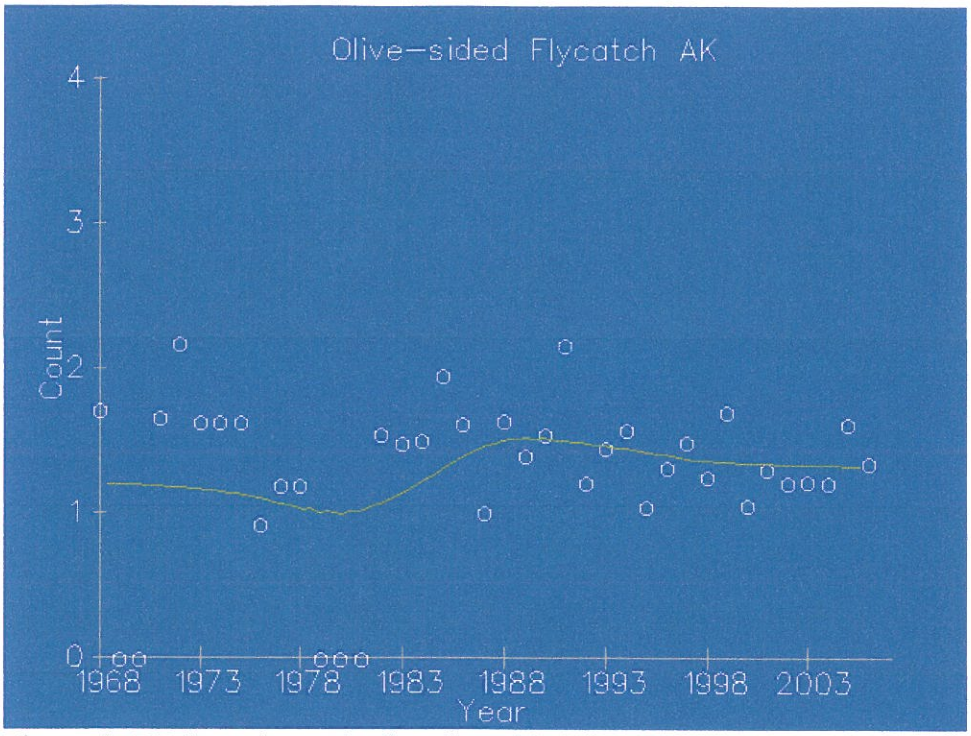

Figure 4. BBS trends results for olive-sided flycatcher in Alaska, 1968-2007 (from Sauer et al. 2008). Y-axis is average count of olive-sided flycatchers per route.

The olive-sided flycatcher was previously listed as a Federal Candidate (Category 2) species prior to discontinuance of the Category 2 list, and is currently a FWS Migratory Bird Program Bird of Management Concern. In 1997, the FWS Northwest Region (Region 1) produced a status review of the species in western North America in fulfillment of a requirement to prepare regional status reports for species listed as nongame "species of management concern" (Altman 1997). A summary for northeastern states was produced by the Service in 1992 (Peterson and Fichtel 1992). The Region 1 status review cumulated in recommendations for more research and monitoring. It also noted that the ability to establish guidelines for management and conservation will be hampered by a lack of natural history information and absence of knowledge of specific factors affecting the species, and that until more data are available, conservation strategies are speculative.

In Alaska, the olive-sided flycatcher is a BLM Sensitive Species and an Alaska State Species of Special Concern (1998, http://www.adfg.state.ak.us/special/esa/esa_home.php). The Alaska Department of Fish and Game's Comprehensive Wildlife Conservation Strategy identified the olive-sided flycatcher as an Alaskan landbird priority species (ADFG 2006, pp. 319 & 336-342). Boreal Partners in Flight ranked it as a priority species for conservation (BPFWG 1999, pp. 81-82), particularly in southeastern and central Alaska biogeographic regions (BPFWG 1999, pp. 14-15). It is also listed as a priority species for conservation on Partners in Flight National Watch List for continental concern as a species that is moderately abundant or widespread with declines or high threats (http://www.pwrc.usgs.gov/pif/WatchListNeeds/default.htm). NatureServe categorizes olive-sided flycatcher as Globally Apparently Secure (G4, November

2000) and within the State of Alaska the breeding population is categorized as Vulnerable to Apparently Secure (S3S4B, August 2004; Gotthardt and McClory 2004, p. 1). "Apparently Secure" is defined as "uncommon but not rare; some cause for long-term concern due to declines or other factors" and "Vulnerable" is defined as "vulnerable in the state due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation." National Audubon Alaska WatchList identifies the olive-sided flycatcher at risk in Alaska due to concerns about its population trend, threats during the breeding season, and threats (outside of Alaska) during the nonbreeding season (Stenhouse and Senner 2005, p. 7).

The IUCN red book lists the olive-sided flycatcher as "near threatened" (last assessed in 2004; www.iucnredlist.org/search/details.php/49930/all).

SUMMARY OF THREATS:

At this time, the ultimate cause for the population decline of the olive-sided flycatcher is unknown. Alteration or loss of habitat is suspected to be a contributing factor, by affecting reproductive efforts and/or prey availability. Olive-sided flycatchers have a low reproductive rate (both due to low clutch size and raising of a single brood per year) and as a result habitat loss can have a large effect on population stability. They are considered a disturbance-dependent species in that they require the presence of large snags and live trees to successfully forage and nest and are often reported to be associated with burned forest (Altman and Sallabanks 2000, pp. 6-7). Certain forest management practices may be detrimental to olive-sided flycatcher reproduction. Fire suppression may be having a negative impact as studies have indicated olive-sided flycatchers are more abundant in forests with early post-fire conditions (Altman and Sallabanks 2000, p. 7), particularly after high severity fire (Hutto 1995). However, a recent study concluded that the species "experienced relatively high nest loss and relatively low prey biomass and foraging rates in burned habitat during the first two years after moderate- to high-severity wildfire" (Meehan and George 2003, p.1111). Results are thus equivocal and more research focused specifically on olive-sided flycatcher habitat use is needed. There is evidence from western United States that nest success is significantly lowered in harvested stands, particularly where salvage harvest occurs, compared with fire origin stands. It is also suggested that logged forests may be "ecological traps" for the species due to relatively higher abundance of nest predators in artificially disturbed forest (Altman and Sallabanks 2000, p. 20; Robertson and Hutto 2007, p. 109).

Climate change could potentially decrease breeding habitat suitability and availability of flying insect prey if favored habitats (e.g., muskegs, bogs, streams) have or become drier than they were historically (ADFG 2006, p. 337). There are some indications of a reduction in the number of shallow closed-basin ponds in boreal regions in the last 50 years (Riordan et al. 2006, p.1). The degree of site fidelity to breeding areas is unknown, but limited data indicate some individuals return to the same area in subsequent years (Altman and Sallabanks 2000, p. 15). Coniferous forest loss is also occurring and projected to increase within the species' breeding range due to damage caused by insect infestations, such as spruce bark beetle (*Dendroctonus rufipennis*) and spruce budworm (*Choristoneura occidentalis*) in the North American Arctic, due to warmer temperatures (ACIA 2004, pp. 54-55).

Although habitat changes have occurred to varying degrees in the breeding range, olive-sided flycatcher populations have been declining consistently across this breeding range in the last 30 years (Altman and Sallabanks 2000, p. 18). Extirpation of the species from unaltered breeding habitat, such as Kings Canyon National Park in California (Marshall 1988, p. 3465-366), has been documented. Non-breeding areas are used by the species the majority of the year and are more geographically restricted; thus, it is suspected that the main cause of the decline may be due to rapid loss of forested habitats on the wintering grounds in the Andes foothills and mountains (Altman and Sallabanks 2000, p. 19). An estimated 25% of northern Andean montane tropical forest remains intact (Armenteras et al. 2003, p. 245). The olive-sided flycatcher is considered highly vulnerable to extinction due to tropical deforestation because of their dependency on undisturbed broadleaved forest during winter; thus would be highly impacted by forest conversion (Petit et al. 1993, p. 78, Petit et al. 1995, pp. 164-165). Habitat alteration along migration routes may also be contributing as the olive-sided flycatcher has a prolonged migration of approximately 1-2 months. Currently, no trend data exist from migration and wintering grounds and research in these areas is needed.

Changes in prey abundance are important due to the olive-sided flycatcher's high degree of specialization in flying insects. Habitat loss, degradation or fragmentation and pesticide use may have indirect effects by eliminating potential prey items (Altman and Sallabanks 2000, p. 19). Although not documented, local prey bases may be severely impacted by pesticide applications to control blackflies, mosquitoes, or injurious forest insects (Gotthardt and McClory 2004, p. 5).

In the last two decades in Canada, many common species of aerial insectivores have declined by 50-70%, indicating changes in food supply as a potential threat in need of research (McCracken 2008, pp. 4-6). Climate change in the past two decades has resulted in higher spring temperatures in parts of world, resulting in earlier peaks in insect abundance (Both and Visser 2001, p. 296). While earlier arrivals and egg-laying dates have been documented for some bird species (Dunn and Winkler 1999, p. 2487), an uncoupling of migration timing and peak prey abundance is occurring for others, as documented for the pied flycatcher (*Ficedula hypolueca*), a long-distant migrant (Both and Visser 2001, p. 297). Long-distance migrants, such as the olive-sided flycatcher, may be constrained in their arrival dates due to spring migration cues initiated by photoperiod, rather than breeding location temperatures, resulting in a predator-prey "mismatch" to environmental conditions (Both and Visser 2001, p. 296; Stenseth and Mysterud 2002, p. 13379; Winkler et al. 2002, p. 13599).

THREATS IN REGION 7:

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>. Boreal Partners in Flight Southcoastal Regional Working Group lists the olive-sided flycatcher as an indicator species that is potentially affected by disturbances of boreal forests by spruce beetle infestations, logging, and fire (Andres 1999, p. 32). Throughout Alaska, some forest management techniques, such as clear-cutting, are likely detrimental to breeding populations due to removal or modification of appropriate foraging and breeding habitat or due to impacts to nest predator and insect prey populations. Fire suppression results in monospecific stands rather than uneven-aged stands preferred by the olive-sided flycatcher. Timber harvesting is a concern,

particularly in southeastern Alaska, where more than 50% of productive forests under state or private ownership have been harvested (Handel 1995, p. 2). White spruce, known to be used for nesting by this species in central Alaska, is harvested for chipped wood on the Kenai Peninsula (Handel 1995, p. 2). In central Alaska, mixed forests of spruce and hardwoods are harvested for saw timber, fiber products, and pulp (Handel 1995, p. 2).

Boreal forest habitat loss is also occurring in parts of the state, particularly in central and southcoastal Alaska, due to urbanization.

Although we have concerns about boreal forest lost, we do not currently have information that the present or threatened destruction, modification, or curtailment of olive-sided flycatcher breeding habitat in Alaska is the cause or to what extend it may be contributing to the decline of the olive-sided flycatcher within Alaska.

B. Overutilization for commercial, recreational, scientific, or educational purposes.
The olive-sided flycatcher does not appear to be at risk due to overutilization for commercial, scientific or educational purposes. Recreational activities may cause disturbances, and may increase as increases in human population and tourism in the state result in building of roads, facilities, trails, etc. within the boreal forest to support such activities (Handel 1995, p. 5).

C. Disease or predation.
While nest predation may be increased in artificially disturbed forest, such as logged forest (Robertson and Hutto 2007, p. 109), there is no information available on whether disease, parasites, or adult predation are threats to the species.

D. The inadequacy of existing regulatory mechanisms.
Although the olive-sided flycatcher was selected as a priority landbird species in Alaska's Comprehensive Wildlife Conservation Strategy (ADFG 2006, pp. 319 & 336-342) and is a Service "species of management concern," no requirement exists for management consideration or regulatory protection.

The Migratory Bird Treaty Act of 1918 protects the species from direct take but does not protect habitat.

E. Other natural or manmade factors affecting its continued existence.
As summarized above, climate change could potentially decrease breeding habitat suitability and availability of flying insect prey if favored habitats (e.g., muskegs, bogs, streams) have or become drier than they were historically within Alaska (ADFG 2006, p. 337). Climate change could also alter olive-sided flycatcher habitat by changing the frequency of fire and bark beetle epidemics (ACIA 2004, pp. 54-55; Soja et al. 2007, p. 291). Alterations in prey availability along migration routes to and from Alaska breeding grounds could affect the energetic requirements of this long-distance migrant (Altman and Sallabanks 2000, p. 19; ADFG 2006, p. 336), perhaps affecting survivorship.
Pesticide use may have indirect effects by eliminating potential prey items (Altman and Sallabanks 2000, p. 19).

We currently lack adequate data to evaluate if other natural or manmade factors are affecting the continued existence of olive-sided flycatchers in Alaska.

Conclusion

Based on BBS data over the last 40 years, there is evidence throughout the breeding range of the olive-sided flycatcher that the species has been declining. Regions with the lowest decline rates, including Alaska, have poor sampling and low precision in estimates. Thus we lack good information on population trends, as well as natural history and knowledge of specific factors affecting the species, to adequately evaluate the flycatcher's status in Alaska (FWS Region 7). Although we are aware of some potential threats to the species in Alaska, we determined we do not have sufficient information on file to support a proposal to elevate the Alaska-breeding population of olive-sided flycatcher to Candidate status. The persistent decline of the species both within Alaska and throughout its range does highlight the need for continuing conservation concern.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

No conservation agreements are known to exist. Because of limited knowledge of this species in Alaska, no conservation measures have been implemented to date.

RECOMMENDED CONSERVATION MEASURES:

Conservation and management needs and actions have been developed by State Bird Conservation Plans and nationally by various organizations, such as Partners in Flight, for Neotropical migrant landbirds and in some cases specifically for olive-sided flycatcher. The Alaska Department of Fish and Game convened a panel of experts to identify problems and concerns, as well as conservation and management needs, for olive-sided flycatcher in Alaska (ADFG 2006, pp. 336-342). As a result of that effort, a list of conservation actions needed for the species both within the state of Alaska and globally are identified in the Alaska Comprehensive Wildlife Conservation Plan (ADFG 2006, pp. 336-342).

It is currently difficult to develop and implement conservation and management actions to halt and reverse the decline of olive-sided flycatcher because the cause of the species' population decline is unknown, limiting factors and habitat requirements are not completely understood, and population trend data are limited in Alaska. Thus, our recommended conservation measures at this time focus on research needs and improvement, continuation, and support of monitoring efforts. All efforts will require communicating information about the decline of this species to the public, academia, and conservation communities, as well as communicating results of research findings and coordinating efforts among agencies and non-governmental groups both within Alaska and among states and countries (Canada and those within winter range in South America) so that appropriate conservation actions can be developed and implemented.

The following list of recommended conservation measures are primarily extracted from the Alaska Comprehensive Wildlife Conservation Plan (ADFG 2006, pp. 337-341). Within Alaska, highest priority should be placed on studies quantifying habitat requirements, demographic deficits, and limiting factors (Steve Matsuoka, FWS, pers. comm. 2008).

Alaska Conservation and Management Needs

1. Conduct targeted demographic studies to identify deficits in reproduction, survival and recruitment and whether such deficits are linked to specific habitats, habitat changes, management actions, geographic locations, exposure to contaminants, diseases, or natural population cycles. Information on survival and recruitment are needed in particular.
2. Conduct studies using stable isotopes and/or genetics to determine important non-breeding sites (migration stop-over, wintering) for Alaskan breeding populations and whether losses of habitats in these areas may be contributing to the decline.
3. Conduct field studies or analyses of existing data to determine important habitats, habitat attributes, and geographic locations for this species in Alaska. Combine such studies with BBS when possible.
4. Effects of disturbance from fires, insect outbreaks, and particularly associated salvage logging activities should be evaluated.
5. Maintain current participation in the BBS in Alaska at a minimum. Identify individuals to adopt routes that have been discontinued; observers must commit to no fewer than three consecutive years of service.
6. Examine independent data on trends from migration stations or other breeding surveys to determine if declines are evident in areas away from the road system in Alaska.
7. Encourage and implement full participation in the Alaska Landbird Monitoring Survey (ALMS), whose random sampling of roadless areas will improve estimates of population size and percent global population in Alaska, reduce bias in trends associated with geographic limited BBS, improve knowledge or distribution and habitat use and, when combined with data from the BBS, increase statistical power in detecting statewide trends. Surveys should be run for no less than 25 years.

Collaboration with universities, non-profits, and State and Federal agencies is needed to implement and monitor these recommended conservation measures in Alaska. A first step could be the convening of a meeting with researchers to discuss and prioritize conservation needs. The results of these research and survey efforts will be used to determine appropriate management approaches in Alaska.

Global Conservation and Management Needs

1. Develop baseline inventory of breeding and wintering populations, as well as habitat needs on breeding and wintering grounds and overwinter survivorship.
2. Effects of forest management on breeding birds should be further evaluated. In particular, prescribed fire and silvicultural systems that mimic the natural effects of fire and beetle outbreaks should be tested as a means of enhancing habitats for this species.
3. Develop numerical goals for conservation (i.e., amount of habitats for restoration) appropriate for each state and province included in the species range and implement strategies for reaching these goals for each area.
4. Increase the amount of land in national or provincial parks and preserves both in Canada and across wintering areas in South America.
5. Encourage the adoption of broad-scale forest management policies that protect important breeding habitats and enhance habitats previously degraded from harvest or other management activities.

6. Encourage the establishment and management of protected areas and restoration of habitat within the wintering range.
7. Extend conservation efforts planned or occurring for other declining Neotropical migrants that winter in South American montane forests, such as cerulean warbler (*Dendroica cerulea*) and golden-winged warbler (*Vermivora chrysoptera*), to include the olive-sided flycatcher.
8. Conduct genetic and stable isotope studies to determine linkages between breeding, staging, and wintering populations to identify important areas and habitats for distinct populations of this species.
9. Analyze data from appropriate migration stations and other breeding and non-breeding surveys to determine if declines are evident from independent data sets and in roadless areas, the latter which may be important in supporting "source" populations.

Similar and more specific suggested research and monitoring needs for olive-sided flycatcher have been identified by the Alaska Natural Heritage Program (Gotthardt and McClory 2004, pp. 5-6), as well as in a number of State Bird Conservation Plans and the Canadian Action Plan in other parts of their range, which are summarized by Partners in Flight National WatchList (http://www.pwrc.usgs.gov/pif/WatchListNeeds/OSFL.htm; accessed September 2008).

Recent joint efforts by a variety of organizations and nationalities to develop proactive approaches to conserving cerulean and golden-winged warblers can serve as a model for global olive-sided flycatcher conservation. In 2002, the Cerulean Warbler Technical Group (CWTG) was formed (Hamel et al. 2004, p. 12) and in 2005 the Golden-Winged Warbler Working Group (GWWA) was founded (http://web.utk.edu/~buehler/GWWA/). Both groups have two subcommittees, one of which coordinates activities on breeding grounds and one on non-breeding grounds. The CWTG has developed the first cerulean warbler conservation plan (CWTG 2007) and the GWWA is developing a wintering ground conservation action plan. The two groups are holding a joint summit in October 2008 in South America to define conservation strategies on the non-breeding grounds through management, research, education, and partnerships (http://www.ecotours.com.co/summit_eng.html). In 2005, American Bird Observatory and Fundación ProAves established the Cerulean Warbler Bird Reserve in Columbia (http://www.proaves.org/article.php?id_article=120). This 550 acre reserve is the first protected area for a Neotropical migrant in South America that also benefits many resident and migrant species, including the olive-sided flycatcher. These efforts for the two warblers also have potential for filling in importation information gaps on olive-sided flycatchers, as well as conservation because the flycatcher's wintering range overlaps with the warblers in the Andes mountains.

DESCRIPTION OF MONITORING:
The USGS Patuxent Wildlife Research Center and the FWS's Migratory Bird Management Division (Region 7) lead the annual roadside BBS program in Alaska. The BBS is currently the main source of data to monitor the population trend of olive-sided flycatchers. However, the BBS only samples a small proportion of the species breeding range in Alaska due to the state's sparse road system and only a short-term data set has been collected at this point. Coverage in

roadless areas (using boats and four-wheelers) has been increasing in recent years (Handel, 1995, p.10).

Boreal Partners in Flight has been working on efforts to establish regional research and monitoring programs for landbirds in Alaska. Monitoring projects besides the BBS include off-road point counts, Monitoring Avian Productivity and Surviorship stations, and migration banding stations. In 2005, Boreal Partners in Flight began development of the Alaska Landbird Monitoring Survey (ALMS) to assess the status of landbird populations in Alaska. The ALMS is designed to monitor landbird breeding populations in roadless areas of the state, which complement BBS data. The Service is one of the nine state, federal, and non-governmental agencies that signed a MOU in 2005 supporting the program and acknowledging the design as the best contemporary means of accomplishing the task of monitoring the status of Alaska's landbird populations (MOU for ALMS, Service # 70181-4-K408, 2005). As of 2007, 60 ALMS plots had been established in the state with a goal to establish 60 more plots by 2012. Currently funding is a challenge for development of the program.

There are no current research or monitoring projects focused specifically on olive-sided flycatchers in Alaska.

COORDINATION WITH STATES:
A draft of this species assessment and listing priority assignment form was reviewed by David Tessler, Regional Wildlife Biologist, Nongame Program, Alaska Department of Fish and Game and Co-Chair of Boreal Partners in Flight. The Alaska Department of Fish and Game identified the olive-sided flycatcher as a landbird priority species in its Comprehensive Wildlife Conservation Strategy (ADFG 2006, pp. 336-342). The suggested conservation and management needs identified in that plan and in the Alaska Natural Heritage Program's status report for the species in Alaska (Gotthardt and McClory 2004, pp. 5-6) provide the most comprehensive summaries of needs for this species in FWS Region 7 and formed the basis for our recommended conservation measures.

LITERATURE CITED

[ACIA] Arctic Climate Image Assessment. 2004. Impacts of a warming Arctic. Cambridge University Press. 146 pp.

[ADFG] Alaska Department of Fish and Game. 2006. Our Wealth Maintained: A Strategy for Conserving Alaska's Diverse Wildlife and Fish Resources. Alaska Department of Fish and Game, Juneau, Alaska. 824 pp.

Altman, B. 1997. Olive-sided flycatcher in western North America: status review. Unpublished report submitted to U.S. Fish and Wildlife Service, Portland, Oregon.

Altman, B. 2000. Nest success and habitat relationships of the olive-sided flycatcher in managed forests of northwestern Oregon. Unpublished report submitted to U.S. Fish and Wildlife Service, Portland, Oregon.

Altman, B. and R. Sallabanks. 2000. Olive-sided flycatcher (*Contopus cooperi*). *In* The Birds of North America, No. 502 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. 28 pp.

Andres, B.A. 1999. Boreal Partners in Flight Working Group 1998 Annual Report. Unpublished report, Alaska Science Center, U.S. Fish and Wildlife Service, Anchorage, AK. 35 pp.

[AOU] American Ornithologists' Union. 1998. Check-list of North American Birds. 7th edition. American Ornithologists' Union, Washington, D.C.

Armenteras D., F. Gast, and H. Villareal. 2003. Andean forest fragmentation and the representativeness of protected natural areas in the eastern Andes, Colombia. Biological Conservation 113:245-256.

Armstrong, R.H. 1995. Guide to the birds of Alaska, fourth ed. Alaska Northwest Books, Anchorage, Alaska. 322 pp.

Banks, R.C. and M.R. Browning. 1995. Comments on the status of revived old names for some North American Birds. The Auk 112(3):633-648.

Bangs, O. and Penard, T.E. 1921. Descriptions of six new subspecies of American birds. Proceedings of the Biological Society of Washington 34:89-92.

Bent, A.C. 1942. Life histories of North American flycatchers, larks, swallows, and their allies. U.S. National Museum Bulletin 179:288-302.

[BPFWG] Boreal Partners in Flight Working Group. 1999. Landbird Conservation Plan for Alaska Biogeographic Regions, Version 1.0. Unpublished report, U.S. Fish and Wildlife Service, Anchorage, Alaska. 109 pp.

Both, C. and M.E. Visser. 2001. Adjustment to climate change is constrained by arrival date in a long-distance migrant bird. Nature 411:296-298.

[CWTG] Cerulean Warbler Technical Group. 2007. A conservation action plan for the cerulean warbler (*Dendroica cerulea*). Unpublished report produced for the USFWS, Division of Migratory Bird Management, Focal Species Program. 14 pp.

[COSEWIC] Committee on the Status of Endangered Wildlife in Canada. 2007. COSEWIC assessment and status report on the Olive-sided Flycatcher *Contopus cooperi* in Canada. Unpublished report, COSWEIC, Ottawa, Canada. vii + 25 pp.

Dunn, E.H., B.L. Altman, J. Bart, C.J. Beardmore, H. Berlanga, P.J. Blancher, G.S. Butcher, D.W. Demarest, R. Dettmers, W.C. Hunter, E.E. Inigo-Elias, A.O. Panjabi, D.N. Pashley, C.J. Ralph, T.D. Rich, K.V. Rosenberg, C.M. Rustay, J.M. Ruth, and T.C. Will. 2005.

High priority needs for range-wide monitoring of North American landbirds. Partners in Flight Technical Series No. 2. Partners in Flight website: http://www.partnersinflight.org/pubs/ts/02-MonitoringNeeds.pdf.

Dunn, P.O. and D.W. Winkler. 1999. Climate change has affected the breeding date of tree swallows throughout North America. Proceedings of the Royal Society of London 266:2487-2490.

Eckhardt, R.C. 1979. The adaptive syndromes of two guilds of insectivorous birds in the Colorado Rocky Mountains. Ecological Monographs 49:129-149.

Fitzpatrick, J.W. 1980. Foraging behavior of Neotropical tyrant flycatchers. Condor 82:43-57.

Gotthardt, T. and J.G. McClory. 2004. Featured species status reports: Olive-sided Flycatcher (*Contopus cooperi*). Alaska Natural Heritage Program, ENRI, UAA, Anchorage, AK. Available http://aknhp.uaa.alaska.edu/zoology/pdfs/birds/OlivesidedFlycatcher.pdf. [accessed September 2008].

Grinnell, J. 1928. Notes on the systematics of west American birds. Part III. Condor 30:185-189.

Hamel, P.B., D.K. Dawson, and P.D. Keyser. 2004. How we can learn more about the cerulean warbler (*Dendroica cerulea*). The Auk 121(1):7-14.

Handel, C.M. 1995. Boreal Partners in Flight: working together to build a regional research and monitoring program. [Online]. Electronic proceeding of the 1995 Partners in Flight International Workshop. Available: http://www.birds.cornell.edu/pifcapemay/handel.htm [accessed March 2008].

Hutto, R.L. 1995. Comparison of bird communities following stand-replacement fires in northern Rocky Mountain forests. Conservation Biology 9:1041-1058.

Hutto, R.L. and J.S. Young. 1999. Habitat relationships of landbirds in the Northern Region, USDA Forest Service. General Technical Report RMRS-GTR-32. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT. 72 pp.

Kessel, B. and D.D. Gibson. 1978. Status and distribution of Alaska birds. Studies in Avian Biology, No. 1. Cooper Ornithological Society (Allen Press), Lawrence, Kansas. 100 pp.

Marshall, J.T. 1988. Birds lost from a giant sequoia forest during fifty years. The Condor 90:359-372.

Mayr, E. and L.L. Short. 1970. Species taxa of North American birds. Publication of The Nuttall Ornithological Club. 9:60.

McCraken, J. 2008. Are aerial insectivores being "bugged out"? BirdWatch Canada 42:4-6.

Meehan, T.D. and T.L. George. 2003. Short-term effects of moderate- to high-severity wildfire on a disturbance-dependent flycatcher in northwest California. Auk 120(4):1102-1113.

Murphy, M.T. 1989. Life history variability in North American breeding tyrant flycatchers: phylogeny, size or ecology? Oikos 54:3-14.

Nuttall, T. 1831. Manual of the ornithology of the United States and of Canada: land birds. Willard and Brown, Cambridge, MA.

Otvos, I.S. and R.W. Stark. 1985. Arthopod food of some forest-inhabiting birds. Canadian Entomologist 117:971-990.

Peterson, J.M.C. and C. Fichtel. 1992. Olive-sided flycatcher, *Contopus borealis*. Pp. 353-367 *In* K.J. Schneider and D.M. Pence (eds.), Migratory nongame birds of management concern in the northeast. U.S. Fish and Wildlife Service, Newton Corner, MA.

Petit, D.R., J.F. Lynch, R.L. Hutto, J.G. Blake and R.B. Wade. 1993. Management and conservation of migratory landbirds overwintering in the Neotropics. Pp. 70-92 *In* D.M. Finch and P.W. Stangel (eds.), Status and management of Neotropical migratory birds. USDA Forest Service General Technical Report RM-229, Fort Collins, Colorado.

Petit, D.R., J.F. Lynch, R.L. Hutto, J.G. Blake, and R.B. Wade. 1995. Habitat use and conservation in the Neotropics. Pp. 145-197 *In* T.E. Martin and D.M. Finch (eds.), Ecology and management of Neotropical migratory birds: a synthesis and review of critical issues. Oxford Univ. Press, New York.

Pyle, P. 1997. Identification guide to North American birds. Part 1: Columbidae to Ploceidae. Slate Creek Press, Bolinas, CA.

Rich, T.D., C.J. Beardmore, H. Berlanga, P.J. Blancher, M.S. W. Bradstreet, G.S. Butcher, D.W. Demarest, E.H., Dunn, W.C. Hunter, E.E. Iñigo-Elias, J.A. Kennedy, A.M. Martell, A. O. Panjabi, D.N. Pashley, K.V. Rosenberg, C.M. Rustay, J.S. Wendt, and T.C. Will. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology, Ithaca, NY.

Riordan, B., D. Verbyla, and A.D. McGuire. 2006. Shrinking ponds in subarctic Alaska based on 1950-2002 remotely sensed images. Journal of Geophysical Research, III, G04002, doi:10.1029/2005JG000150.

Robertson, B.A. and R.L. Hutto. 2007. Is selectively harvested forest an ecological trap for olive-sided flycatchers? The Condor 109:109-121.

Sauer, J.R., J.E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966-2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, Maryland. [online] Available at: http://www.mbr-pwrc.usgs.gov/bbs/bbs.html. [accessed August 2008].

Soja, A.J., N.M. Tchebakova, N.H.F. French, M.D. Flannigan, H.H. Shugart, B.J. Stocks, A.I. Sukhinin, E.I. Parfenova, F.S. Chapin III, and P.W. Stackhouse, Jr. 2007. Climate-induced boreal forest change: Predictions versus current observations. Global and Planetary Change 56: 274-296.

Stenhouse, I.J. and S.E. Senner. 2005. Alaska WatchList – 2005. Audubon Alaska, Anchorage, AK.

Stenseth, N.C. and A. Mysterud. 2002. Climate, changing phenology, and other life history traits: nonlinearlity and match-mismatch to the environment. Proceedings of National Academy of Sciences. 99(21):13379-13381.

Winkler, D.W., P.O. Dunn, and C.E. McCulloch. 2002. Predicting the effects of climate change on avian life-history traits. 99(21):13595-13599.

Wright, J.M. 1997. Olive-sided Flycatchers in central Alaska. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration, Final Report. Project SE-3-4, Juneau, Alaska.

Zink, R.M. and N.K. Johnson. 1984. Evolutionary genetics of flycatchers, 1. Sibling species in the genera *Empidonax* and *Contopus*. Systematic Zoology 33:205-216.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: Thomas O. Melius
Regional Director, Fish and Wildlife Service Date Sept. 26, 2008

Concur: _____
Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review:
Conducted by: